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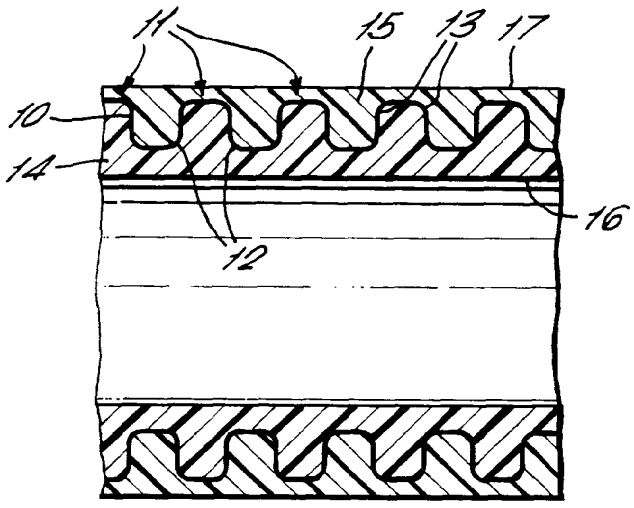
(54) Composite tube with a convoluted cove

(57) The disclosure relates to a composite tubing comprising a convoluted tubular core (10) having coextruded inner (16) and outer (15) plastics layers providing a composite tube having a smooth inner bore (16) and a smooth outer surface (17).

FIG. 1.



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Description

This invention relates to composite tubing which can readily be bent to a required shape or profile.

Various forms of convoluted tubing are known for different applications. In particular tubing is convoluted to allow for greater flexibility without kinking. In addition plastics tubing having appropriate inner and outer layers is known especially in applications where different characteristics are required for the inner and outer layers of the tube.

This invention provides a composite tubing comprising a convoluted tubular core having coextruded inner and outer plastics layers providing a composite tube having a smooth inner bore and a smooth outer surface.

More specifically the tubular core may have circumferentially extending convolution spaced along its length.

Further, the core may be formed from a metal or plastics which takes a permanent set when bent so that bending the resulting composite tubing containing the core results in the tubing taking a permanent set.

In one arrangement according to the invention the convolutions encircling the tube may be of generally square profile having rounded inner and outer corners.

In one alternative construction the convolutions extend lengthwise of the tube.

The following is a description of some specific embodiments of the invention, reference being made to the accompanying drawings, in which :

Figure 1 is a cross-sectional view through a length of coextruded tube having inner and outer layers in accordance with the present invention; and

Figure 2 is a cross-sectional view through the tubing of Figure 1 with the inner layer cut away over part of the length and the outer layer cut away over the remainder.

Referring firstly to Figure 1 of the drawings, there is shown a three part composite tube comprising an inner metal or polymeric core 10 formed with circumferential convolutions 11 at spaced locations throughout the length of the core. The convolutions are of a generally square form with rounded inner and outer corners indicated at 12 and 13 respectfully.

The core is coated on its inner and outer surfaces with layers of polymer material 14, 15 which are co-extruded onto the core in a single extruding operation to form a composite tube having a smooth inner bore 16 and a smooth outer surface 17.

The inner convoluted tubular core is relatively stiff in relation to the polymeric layers but when flexed, adopts a permanent set. Thus the composite tubing can be bent to a required radius or other shape and the inner core will hold the tubing in that shape.

It will be appreciated that the inner core may be formed with other forms of convolution and may even be convoluted lengthwise. Also it may be formed from polymeric materials of the required stiffness and flexibility.

Metal/plastic combination tubes already exist in certain applications. They offer a range of advantages : greater mechanical strength/stiffness; lower thermal expansion; constant stiffness over a working temperature range; reduced or eliminated permeations; and fire resistance. Also the metal layer overcomes the plastics "memory" and allows the tube to be more readily formed to the required shape.

Convoluted tubes in plastic and metal already exist. They offer greater flexibility without kinking, etc.

The present invention combines a convoluted tubular core with coextruded inner and outer layers of polymeric material applied to the core. The resulting composite tubing has the following advantages :

- Convoluted tube but with smooth inside and outside diameters allowing conventional sealing, etc.
- Plastic tube can be tailored by varying the internal convolution formed to have optimal mechanical properties in terms of stiffness but without sacrificing cost and weight through excessive use of material.
- Convoluted layer allows tube to be easily cut (due to thinner metal) but reduces distortion of tube end due to flattening during cutting and use.
- Convolution can also act as a guide to help ensure cut end of the tube is square with its axis.
- Convoluted layer can also be made of plastics.

Claims

1. A composite tubing comprising a convoluted tubular core having coextruded inner and outer plastics layers providing a composite tube having a smooth inner bore and a smooth outer surface.

2. A composite tubing as claimed in claim 1, wherein the tubular core has circumferentially extending convolution spaced along its length.

3. composite tubing as claimed in claim 1 or claim 2, wherein the core is formed from a metal or plastics which takes a permanent set when bent so that bending the resulting composite tubing containing the core results in the tubing taking a permanent set.

4. A composite tubing as claimed in claim 2 or claim 3, wherein the convolutions encircling the tube are

of generally square profile having rounded inner and outer corners.

5. A composite tubing as claimed in claim 1, wherein the convolutions extend lengthwise of the tube.

FIG. 1.

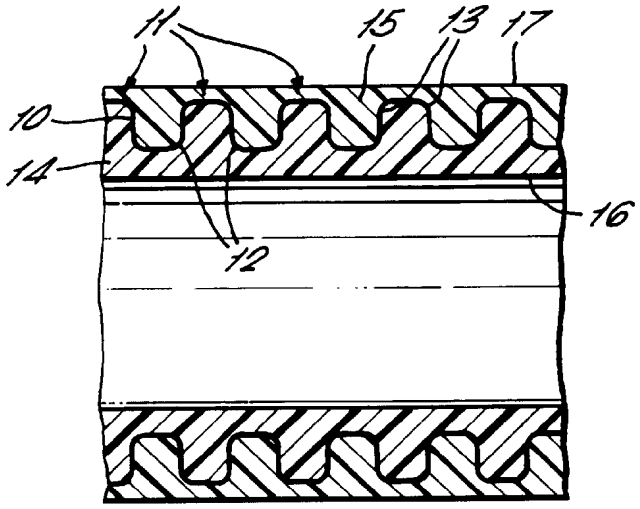
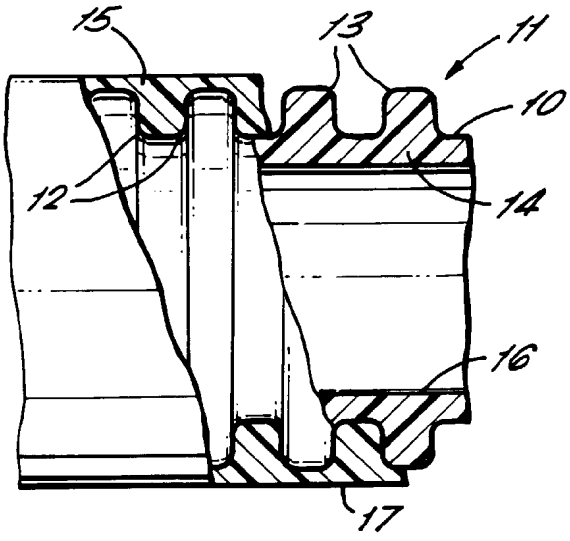


FIG. 2.



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EUROPEAN SEARCH REPORT

Application Number
EP 97 30 0936

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	EP 0 616 160 A (TITEFLEX CORP) 21 September 1994	1-3,5	F16L11/112
Y	* the whole document *	4	

Y	US 5 129 429 A (WINTER JEFFREY J ET AL) 14 July 1992	4	
A	* abstract; figures 2,11,13 *	1-3	

A	US 3 872 893 A (ROBERTS ROBERT E) 25 March 1975	1-5	
	* the whole document *		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

F16L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	27 May 1997	Theodoropoulos, I

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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